

TECHNICAL MANUAL

OPERATOR'S MANUAL

**MULTIPLE INTEGRATED LASER
ENGAGEMENT SYSTEM
(MILES 2000)**

FOR

**AUTOMATIC SMALL ARMS ALIGNMENT FIXTURE
(ASAAF)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

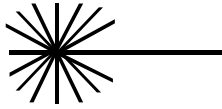
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27 MAY 2002



LASER WARNING

Suitable precautions must be taken to avoid possible damage to the eye from overexposure to radiated laser energy. Precautionary measures include the following:

- **NEVER fire the laser** at personnel within 10 meters.
- **NEVER look at the laser transmitter** through magnifying optics such as binoculars, telescopes, or periscopes at ranges less than 40 meters.

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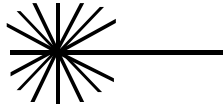
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SAFETY SUMMARY



LASER WARNING

Suitable precautions must be taken to avoid possible damage to the eye from overexposure to radiated laser energy. Precautionary measures include the following:

- **NEVER fire the laser** at personnel within 10 meters.
- **NEVER look at the laser transmitter** through magnifying optics such as binoculars, telescopes, or periscopes at ranges less than 40 meters.

WARNING

CAUTION

- Ensure battery door is securely closed during storage and operations, or damage can occur to the battery door.
- Alignment Head should not be bumped, and weapon should remain stable during alignment process.

For information on **FIRST AID**, refer to **FM21-11/MCRP-3-02G**.

HOW TO USE THIS MANUAL

INTRODUCTION.

This manual contains operation instructions for the Multiple Integrated Laser Engagement System (MILES 2000), Tactical Engagement Simulation System (TESS), when configured with the Automatic Small Arms Alignment Fixture (ASAAF).

MANUAL DESCRIPTION.

This manual is divided into three chapters. Chapters are further divided into sections. The chapter descriptions are provided in the following subparagraphs.

Chapter 1 is an introduction that provides general information, equipment description and data, and theory of operation.

Chapter 2 provides operating instructions.

Chapter 3 provides operator maintenance instructions.

CHAPTER 1 INTRODUCTION

SECTION I. GENERAL INFORMATION

1.1 SCOPE

This manual describes how to install, operate, and maintain the Multiple Integrated Laser Engagement System (MILES 2000), Tactical Engagement Simulation System (TESS), when configured with the Automatic Small Arms Alignment Fixture (ASAAF). The manual also explains all authorized operator maintenance. Refer any maintenance problems not covered to organizational maintenance personnel.

1.2 MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those described by DA PAM 738-750, The Army Maintenance Management System (TAMMS). Marine Corps personnel will use TM 4700-15/1, Equipment Record Procedures, and refer to the on-line MCPDS or Marine Corps Stocklist SL-1-2, Index of Technical Publications.

1.3 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS

If your MILES 2000 equipment for the Automatic Small Arms Alignment Fixture (ASAAF) needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on a Quality Deficiency Report. Mail to us at Commander, Simulation, Training, and Instrumentation Command (STRICOM), ATTN: AMSTI-OPS-L, 12350 Research Parkway Orlando, FL 32826-3276. We'll send you a reply. For U.S. Marine Corps personnel, submit SF-368 in accordance with MCO 4855.10 (Quality Deficiency Report) to: Commander, Marine Corps Logistics Base (Code G316-1), 814 Radford Boulevard, Albany, GA 31704-1128.

1.4 CORROSION PREVENTION AND CONTROL

- a. Corrosion Prevention and Control (CPC) of Army material is a continuing concern. It is important that any corrosion problems with this item be reported so the problem can be corrected and improvements can be made to prevent the problem in the future.
- b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling or breaking of these materials may be a corrosion problem.
- c. If a corrosion problem is identified, it can be reported using form SF-368. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure the information is identified as a CPC problem.
- d. The form should be submitted to Commander, Simulation, Training, and Instrumentation Command (STRICOM), ATTN: AMSTI-OPS-L, 12350 Research Parkway Orlando, FL 32826-3276. U.S. Marine Corps personnel, submit SF-368 in accordance with MCO 4855.10 (Quality Deficiency Report).

1.5 PREPARATION FOR STORAGE OR SHIPMENT

When receiving equipment for storage or shipment, always inspect the returned equipment for damage, breaks, cracks and cleanliness.

1.6 LIST OF ABBREVIATIONS AND GLOSSARY.

Refer to Table 1-1 for the list of abbreviations used in this manual and to Table 1-2 for the glossary.

Table 1-1. List of Abbreviations

AAV	Assault Amphibious Vehicle
AC-DC	Alternating Current/Direct Current
ASAAF	Automatic Small Arms Alignment Fixture
ATWESS	Anti-Tank Weapons Effects Signature Simulator
AVCPS	Audio Visual Cue Pyrotechnic Simulator
BFA	Blank Firing Adapter
BIT	Built-In-Test
CD/TDTD (Controller Gun)	Controller Device/Training Data Transfer Device
CDA	Control Display Assembly
CPC	Corrosion Prevention and Control
CSWS	Crew Served Weapon System
CU	Control Unit
CVC	Combat Vehicle Crew
CVS	Combat Vehicle System
DC-DC	Direct Current/Direct Current
DIFCUE	Direct/Indirect Fire Cue
DPCU	Data Processing Control Unit
EIR	Equipment Improvement Recommendation
EOD	Explosive Ordnance Disposal
FCU	Fire Control Unit
FlashWESS	Flash Weapons Effects Signature Simulator
FU	Firing Unit
ID	Identification
I/O	Input/Output
IR	Infrared
ISU	Integrated Sight Unit
ITS	Independent Target System
IWS	Individual Weapons System
IWS Console (DPCU)	Individual Weapons System Console (Data Processing Control Unit)

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Table 1-1. List of Abbreviations - Continued.

KSI	Kill Status Indicator
LAV	Light Armored Vehicle
LASER	Light Amplification by Simulated Emission of Radiation
LED	Light Emitting Diode
LTU	Laser Transmitter Unit
LU	Loader Unit
MARS	MILES After-Action Review System
MCS	Master Control Station
MG	Machine Gun
MGS	Missile Guidance System
MGSS	Main Gun Signature Simulator
MILES	Multiple Integrated Laser Engagement System
O/C	Observer Controller
OTPD	Optical Turret Positioning Device
PID	Player Identification
Pk	Probability of Kill
PMCS	Preventive Maintenance Checks and Services
PROM	Programmable Read-Only Memory
SAT	Small Arms Transmitter
SMAW	Shoulder-Mounted Assault Weapon
SWS	Surrogate Weapons System
TAMMS	The Army Maintenance Management System
TESS	Tactical Engagement Simulation System
TNB	Turret Network Box
TOW	Tube-Launched Optically-Tracked Wire-Guided Weapon System
ULT	Universal Laser Transmitter
Vac	Volts Alternating Current
Vdc	Volts Direct Current

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Table 1-2. Glossary.

Administrative Kill	A kill assessed by a Controller for administrative purposes.
Automatic Small Arms Alignment Fixture (ASAAF)	Device used to align the Small Arms Transmitter (SAT) to the sights on a weapon.
Catastrophic Kill	A kill that totally disables a vehicle or individual.
Cheat Kill	A kill is assessed to a system when a tamper attempt has been detected.
Commo Kill	A kill that disables external communications.
Commo Override	Use the Control Unit USER INFO/ENTER push button to override the communications disable function under Communications/ Catastrophic Kill conditions in an emergency
Controller	An umpire or referee in a MILES 2000 training exercise.
Controller Device (CD/TDTD)	A device used by the Controller to upload, download and test the MILES 2000 system. (Controller Gun)
Direct/Indirect Fire Cue (DIFCUE)	A device that produces flash, noise, and smoke to simulate a vehicle being hit by direct or indirect fire.
Fastener Tape	A hook and pile type tape used to hold vehicle detector belts and other MILES 2000 equipment in place.
Firepower Kill	A kill that disables vehicle weapons.
Helmet Harness	The part of the IWS attached to the helmet or soft cover.
Hit	Simulated contact with incoming fire that does not result in a Kill.
Individual Weapons System (IWS)	The Helmet and Torso Harness assemblies and IWS Console (DPCU), which is worn by personnel. This equipment also includes the Small Arms Transmitter (SAT).
Kill	Refer to Catastrophic Kill, Commo Kill, Firepower Kill, or Mobility Kill
Kill Status Indicator (KSI)	A device attached to a vehicle that produces an external flashing light indicating a Hit, Near Miss or Kill.
LASER	Light Amplification by Stimulated Emission of Radiation. A narrow beam of light capable of transmitting information.
Laser Beam	In MILES 2000 equipment, an eye-safe, invisible beam of light that simulates weapons fire.
Laser Detector	A device that senses incoming laser beams.
Laser Transmitter	A device that transmits a laser beam.
Main Gun Signature Simulator (MGSS)	A device that produces a flash and bang to simulate main gun firing.
Mobility Kill	A kill that disables the vehicle movement. The crew has 20 seconds to bring the vehicle to a stop. If motion is sensed after the 20 seconds, a Cheat Kill will occur.
Near Miss	Laser fire close enough to be sensed by a laser detector, but not close enough to cause a Hit or Kill.

Table 1-2. Glossary - Continued.

Optical Turret Positioning Device (OTPD)	A device that provides an optical reference signal to the turret detector belts (on applicable vehicles) to determine the turret position with reference to the hull.
Reset	Brings the system to the ready (alive) condition. In a CVS, the reset brings the system to a ready condition and returns ammunition to the default levels.
Resurrect	When a CVS is resurrected, the system is brought to a ready condition, but the ammunition levels remain as they were when the system was killed.
Sleep Mode	When the SAT is in the rest or inactive state.
Small Arms Transmitter (SAT)	A laser transmitter used on various individual and vehicle-mounted rifles and machine guns.
Torso Harness	The part of the IWS that is worn on the upper body.
Universal Laser Transmitter (ULT)	A laser transmitter used on various combat vehicle systems mounted on the main gun and the coax machine gun.
Weapon Token	Is embedded in software and allows the IWS Console (DPCU) to enable a SAT. The Weapon Token is transmitted to the IWS when the system is reset/resurrected by the CD/TDTD. The SAT cannot be enabled without a Weapon Token and will not have one in the following conditions: system is killed or another SAT is enabled with the same Torso Harness.

NOTE

Army vehicle kits contain the SATs for the vehicle mounted weapons, but do not include IWS SATs. Marine Corps vehicle kits do not include any IWS items.

1.7 SAFETY, CARE AND HANDLING

Before, during and after operation of equipment, read and adhere to all applicable WARNINGS and CAUTIONS. Perform all preventive maintenance checks and services as scheduled, and report any discrepancies as soon as possible. Use the proper tools and procedures for installation, troubleshooting, removal and replacement of components, and notify higher echelon maintenance personnel when warranted.

Although MILES 2000 consists of ruggedized equipment designed to withstand extreme vibration, shock and environmental stresses, treat the equipment with reasonable care; do not use excessive force when handling, packing or stowing equipment. Responsible handling and use will help prolong the life cycle and appearance of the equipment.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1.8 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The MILES 2000 ASAAF is a tool used for automatic boresight alignment of the Small Arms Transmitter (SAT) for the Individual Weapons System (IWS).

1.8.1 Equipment Characteristics The ASAAF consists of the ASAAF Display Assembly and the Alignment Head.

1.8.2 Capabilities and Features.

- a. Aligns the SAT to ensure accuracy of laser fire.
- b. Provides dry-fire codes to the SAT so that firing of blank ammunition is not necessary for boresighting.
- c. Easily installed and operated.
- d. Capable of aligning SATs for all Individual Weapons Systems (IWS).
- e. Capable of aligning SATs for Combat Vehicle Systems (CVS) (except the AAV-P7, LAV-25 and M1A1).
- f. Capable of aligning SATs for the hardtop HMMWV M-2 [Independent Target System (ITS)].

1.9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

The MILES 2000 ASAAF contains the following equipment:

- a. ASAAF Display Assembly. Contains the controls and indicators for choosing alignment parameters.
- b. ASAAF Alignment Head. Performs the alignment.

1.10 EQUIPMENT DATA. Table 1-3 defines the equipment data.

Table 1-3. Equipment Data.

EQUIPMENT	WEIGHT (POUNDS)	DIMENSIONS L X W X D (INCHES)
ASAAF Display Assembly	2.36	6.02 x 6.08 x 2.99
ASAAF Alignment Head	1.04	5.5 x 4.25 x 2.5

SECTION III. THEORY OF OPERATION

1.11 BASIC PRINCIPLES OF OPERATION

1.11.1 Principles of Operation (MILES 2000) The MILES 2000 system uses laser beams to simulate actual weapons fire. An eye-safe invisible laser beam is sent out by each weapon's transmitter when it is fired. The laser beam is coded, and simulates all of the weapon's capabilities including range, accuracy and destructive capability.

Laser detector systems are used to sense opposing fire. The detector systems register incoming laser beams and determine whether they have scored a Near Miss, Hit, or Kill. Incoming fire can result in more than one type of a Hit or Kill. Types of Hits or Kills include Mobility, Communications, Firepower or a Catastrophic Kill of the entire vehicle. A Catastrophic Kill will occur from a combination of any two (2) types of kills.

Table 1-4 defines the Kill Indication Chart.

1.11.2 Principles of Operation (ASAAF) When MILES 2000 equipment is used with the Individual Weapons System (IWS), Combat Vehicle System (CVS), or Independent Target System (ITS), the soldier cannot boresight or "zero" the weapon in the usual manner. Therefore, the ASAAF is provided so that the Small Arms Transmitter (SAT) installed on the weapon can be boresighted to ensure weapons accuracy.

1.11.3 Theory of Operation (ASAAF). The ASAAF Alignment Head is attached to the SAT, which is installed on a weapon. The ASAAF has an illuminated reticle (Heads-Up Display) which is aligned to the weapon sights. When the Align push button is activated, the control unit of the Display Assembly causes the SAT to be repetitively triggered while monitoring the SAT's Fire LED for proper operation. The optics unit in the Alignment Head senses the location of the laser and sends that data to the control unit in the Display Assembly, which in turn causes the Alignment Head to make the necessary adjustments to the SAT. The process continues in real time until the SAT is precisely aligned [usually two (2) minutes]. The control unit, in conjunction with the optics unit, also checks for laser power levels, laser coding, IR link verification, SAT low battery, it assesses if the SAT's alignment optics are performing as desired, and the operational status of the BLANK FIRE circuitry.

1.11.4 ASAAF Configuration The ASAAF consists of the Display Assembly and the Alignment Head. The Alignment Head contains an Optics Unit (Heads-Up Display) (the assembly which projects the illuminated target reticle to the soldier during boresighting, and senses the precise location of the weapons laser with respect to the reticle); and the Display Assembly provides a user-friendly LCD display and controls, which continuously inform the user of the weapon status while progressively instructing the user throughout the alignment process. The Alignment Head is attached to the SAT, and automatically adjusts the SAT's laser position as directed by the Display Assembly. The Display Assembly (Figure 2-1) and the Alignment Head (Figure 2-2) communicate via an Interface Cable.

Table 1-5 defines the kit/equipment list, and Figure 1-1 shows the layout of the ASAAF equipment stored in the transit case.

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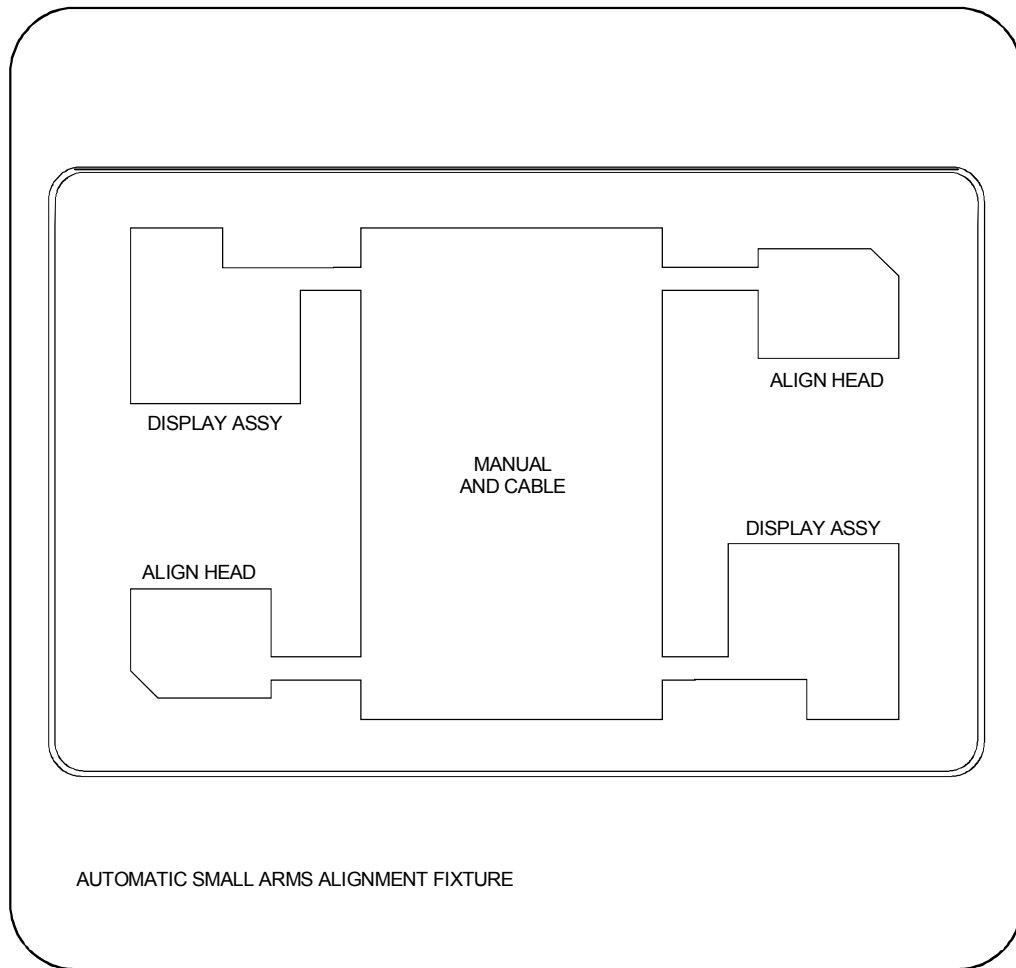
Table 1-4. Kill Indication Chart.

Type of Hit/Kill	Number of KSI Flashes	Audible Indication
Vehicle		
SMAW Spotting Rifle	1 Flash	None
Near Miss	2 Flashes	Near Miss.
Hit	4 Flashes	Hit.
Mobility Kill	4 Flashes	Hit, Mobility. Stop Vehicle. (the crew has 20 secs to bring the vehicle to a stop)
Fire Power Kill	4 Flashes	Hit, Fire Power.
Communications Kill	4 Flashes	Hit, Commo Kill. (disables external communications only)
Catastrophic Kill	Flashes Continuously	Vehicle Kill.
Administrative Kill	Flashes Continuously	Vehicle Kill.
Cheat Kill	Flashes Continuously	Cheat Kill.
Reset	1 Flash	Reset/Resurrect.
IWS		
Near Miss	N/A	2 Beeps
Kill	N/A	Continuous
Administrative Kill	N/A	Continuous
Cheat Kill	N/A	Continuous
Reset	N/A	4 Beeps
<p>Notes: Cheat Kill will occur during a Mobility Kill if the vehicle does not stop within the allotted 20 seconds or moves after it has stopped. A Cheat Kill will occur when disconnecting any of the following pieces of vehicle equipment: KSI, any Detector Belt/Array, or Power Controller (must be reconnected for cheat to be indicated), or removing the battery on IWS Console (DPCU).</p> <p>In the event of a Catastrophic or Communications kill, external communications can be over-ridden for EMERGENCIES ONLY by pressing the USER INFO push button on the side of the Control Unit, selecting Communication Override and pressing the ENTER push button.</p>		

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Table 1-5. Kit/Equipment List.

PACKAGE NOMENCLATURE: AUTOMATIC SMALL ARMS ALIGNMENT FIXTURE				
PACKAGE PERTAINS TO: MILES 2000				
PACKAGE CONTENTS				
QUANTITY	NAME OF ITEM	DWG NO.	PART NO.	NOTES
AR	TRANSIT CASE, ASAAF	147392	147392-1	1
1	ASAAF ASSY	147995	147995-1	
AR	OPERATOR'S MANUAL		TD 23-6920-705-10	
500	LOCK, WEDGE -SAT	147953	147953-7	
1	TORQUE SET 60 IN. LB.	147674	147674-1	
1	TORQUE SET 85 IN. LB.	147674	147674-2	
5	HEX KEY, 5/32		7122A46	2
5	HEX KEY 3/16		7122A47	2
1	BAG, TOOL		6565A11	2
1	DRY FIRE TRIGGER ASSY	147960	147960-1	
<p><u>NOTES:</u></p> <p>1. MAX QUANTITY TWO (2) ASAAF KITS MAY BE PACKED IN ONE TRANSIT CASE.</p> <p>2. MAY BE PURCHASED FROM MCMaster-CARR, CAGE CODE 39428</p>				



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Figure 1-1. ASAAF Transit Case.

CHAPTER 2 OPERATING INSTRUCTIONS

SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1 EQUIPMENT FIGURES AND TABLES

The following figures, as listed in Table 2-1, illustrate and describe the MILES 2000 Automatic Small Arms Alignment Fixture (ASAAF) operating controls and indicators.

Table 2-1. Controls and Indicators Reference.

ITEM	FIGURE NO.
Display Assembly	2-1
Alignment Head	2-2

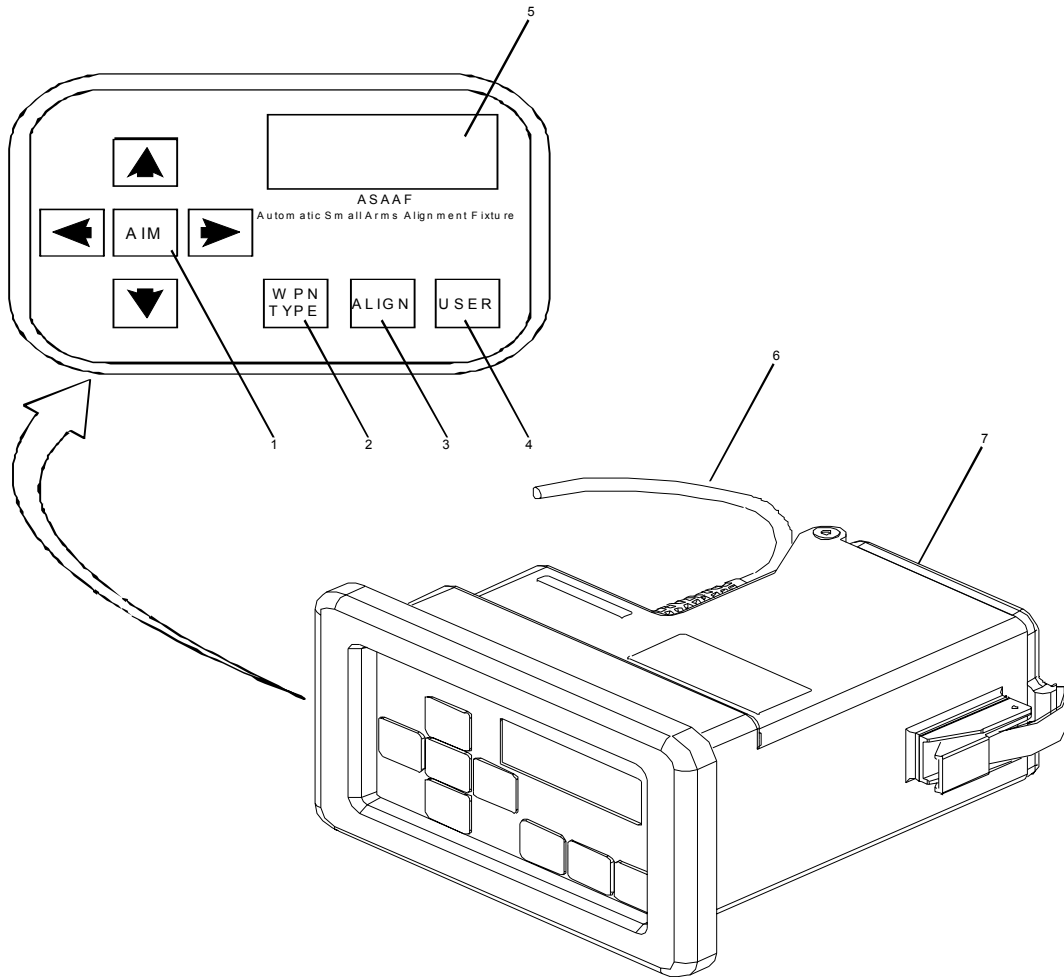
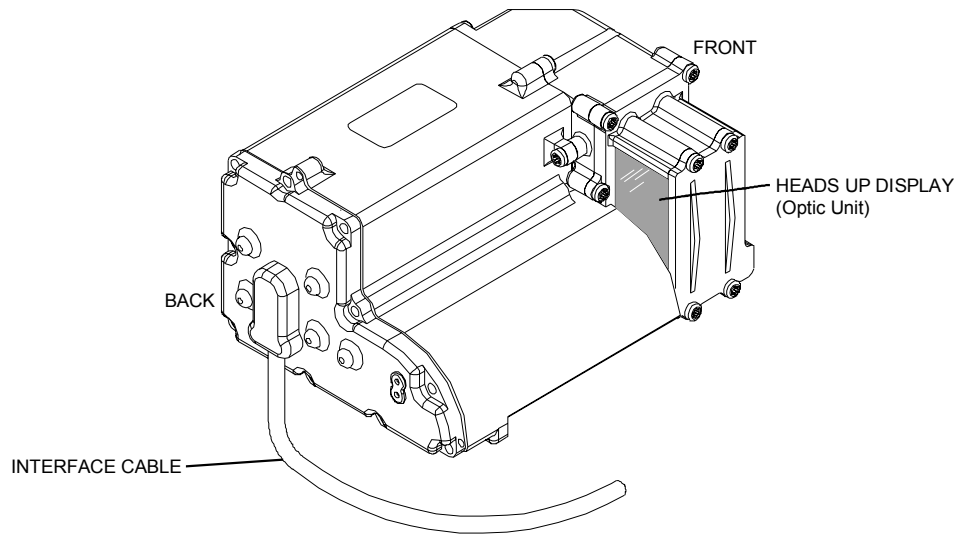


Figure 2-1. Display Assembly.

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1. **AIM and ARROW PUSH BUTTONS.** The AIM push button is pressed to bring up the reticle cross hairs to align the sights. The arrow push buttons are used to line up the sights with the cross hairs.
2. **WPN TYPE PUSH BUTTON.** Used to choose the type of weapon.
3. **ALIGN PUSH BUTTON.** Once sights are lined up with cross hairs, user selects this push button to begin the alignment process.
4. **USER PUSH BUTTON.** Used as an operator "ENTER" push button and to perform manual BIT.
5. **DISPLAY WINDOW.** Provides the readout for data currently selected.
6. **INTERFACE CABLE.** Connects the Alignment Head to the Display Assembly.
7. **BATTERY COMPARTMENT.**



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Figure 2-2. Alignment Head.

SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Preventive Maintenance Checks and Services (PMCSs) will ensure that the MILES 2000 equipment will be ready for operation and perform satisfactorily throughout its mission. Preventive maintenance checks consist of performing a systematic inspection to discover defects before they result in operational failure of the equipment. Defects or malfunctions discovered by the crew during use of the MILES 2000 equipment, or as a result of performing maintenance checks and services, will be reported using the proper forms.

2.2 INTRODUCTION TO PMCS TABLE

Operator preventive maintenance checks and services are shown in Table 2-2. Tasks to be performed before operation appear in the “B” column under the heading “Interval”; tasks to be performed during operation are checked in the “D” column; tasks to be performed after operation are checked in the “A” column; tasks to be performed weekly are checked in the “W” column; and tasks to be performed monthly are checked in the “M” column.

NOTE

Within designated interval, these checks are to be performed in the order listed.

B - Before Operation	W - Weekly
D - During Operation	M - Monthly
A - After Operation	

Table 2-2. Operator Preventive Maintenance Checks and Services.

ITEM NO.	ITEM TO BE INSPECTED	INTERVAL B D A W M					PROCEDURES CHECK FOR AND HAVE REPAIRED	EQUIPMENT IS NOT READY/AVAILABLE IF:
1.	Display Assembly	✓		✓			Inspect for cracks in display window and membrane switches.	Display window or membrane switch broken or cracked.
		✓	✓				Check for display in display window.	No display in display window.
		✓					Check for battery in unit.	Battery not present.
2.	Alignment Head	✓		✓			Check that spring mounting is functional.	Spring mounting not functional.
		✓		✓			Check that the cable is not frayed or missing.	Cable is frayed or missing.

SECTION III. OPERATION UNDER USUAL CONDITIONS

2.3 ASSEMBLY AND PREPARATION FOR USE

MILES 2000 equipment must be inspected and prepared as described in the following paragraphs prior to use.

2.3.1 Initialization Procedures

Before operating the ASAAF, perform the following:

- a. Ensure Preventive Maintenance Checks and Services (PMCS) described in Section II have been performed.
- b. Install one 6-volt NEDA 908A-type 529 (lantern) battery in the battery compartment as follows:
 - (1) On the back of the ASAAF Display Assembly, release the latch on the hinged battery compartment cover.
 - (2) Insert battery with the positive end first.

CAUTION

Ensure battery door is securely closed during storage and operations, or damage can occur to the battery door.

- (3) Replace the battery cover by closing it and pushing on the cover until it latches.
- c. Perform functional checks described in Section V.

2.3.2 Installation Procedures. (See Figures 2-3 and 2-4.)

- a. If present, remove the wedge-lock from the rear of the SAT prior to aligning it with the ASAAF Alignment Head.

CAUTION

Alignment Head should not be bumped, and weapon should remain stable during alignment process.

- b. Holding the Alignment Head at a 45 angle, place the front of the Alignment Head onto the SAT and pull the Alignment Head to the rear compressing the “red tab” spring. Lower the remaining part of the Alignment Head onto the SAT and gently release, allowing the alignment gears to mate.

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TM 6920-10/2

- c. The “red tab” at the front of the Alignment Head should be recessed into the Head. If not, press the AIM button on the ASAAF Display Assembly. This will momentarily run the motors. While motors are running, gently rock the Alignment Head back and forth until the gears are correctly seated and the “red tab” is recessed into the Alignment Head. Repeat process if gears fail to mate.
- d. Set the Display Assembly close to the weapon.

2.4 OPERATION PROCEDURES.

NOTE

Because the weapon must not be moved during alignment, it is recommended that the weapon be placed on a support such as a bipod or tripod mount. If no support fixture is available, the alignment should be performed as a two-man operation, with one holding the weapon steady and the other operating the controls on the Display Assembly.

- a. Once the battery is installed, the ASAAF will run a start-up Built-In-Test (BIT). (This is accomplished very quickly; watch closely.) An interactive switch test will then be performed. If BIT is passed, the display will indicate “Built-In-Test Passed, install weapon, WPN TYPE or AIM” indicating the ASAAF is ready for operation. A BIT failure will be displayed as “FAIL [xxxxx]” where [xxxxx] is the five (5) character failure code. If the BIT fails, refer to Chapter 3, Section I, Troubleshooting. If the BIT passes, perform the following instructions:
 - (1) The ASAAFs default weapon type is the M16A2. If aligning a different weapon, press “WPN TYPE” on the Display Assembly at this time. Use the Arrow push buttons to select a weapon type from the display. To confirm the selection, press the WPN TYPE push button on the Display Assembly.
 - (2) At this point, the Alignment Head must be seated properly. The sockets in the head will spin and mesh with the shafts on the rear of the SAT. If the “red tab” is not recessed when the motors stop turning, press the AIM switch again and gently rock the head from side-to-side as the motors are turning.
 - (3) The AIM push button also activates the reticle in the Heads-Up Display (Optic Unit). Sight down the weapon as normally done during firing. Adjust the reticle with the Arrow push buttons so that the rear sight, front sight, and reticle are lined up.
 - (4) When the sights and reticle are lined up, press the ALIGN push button. This activates the boresighting and should be completed in approximately one to two minutes.

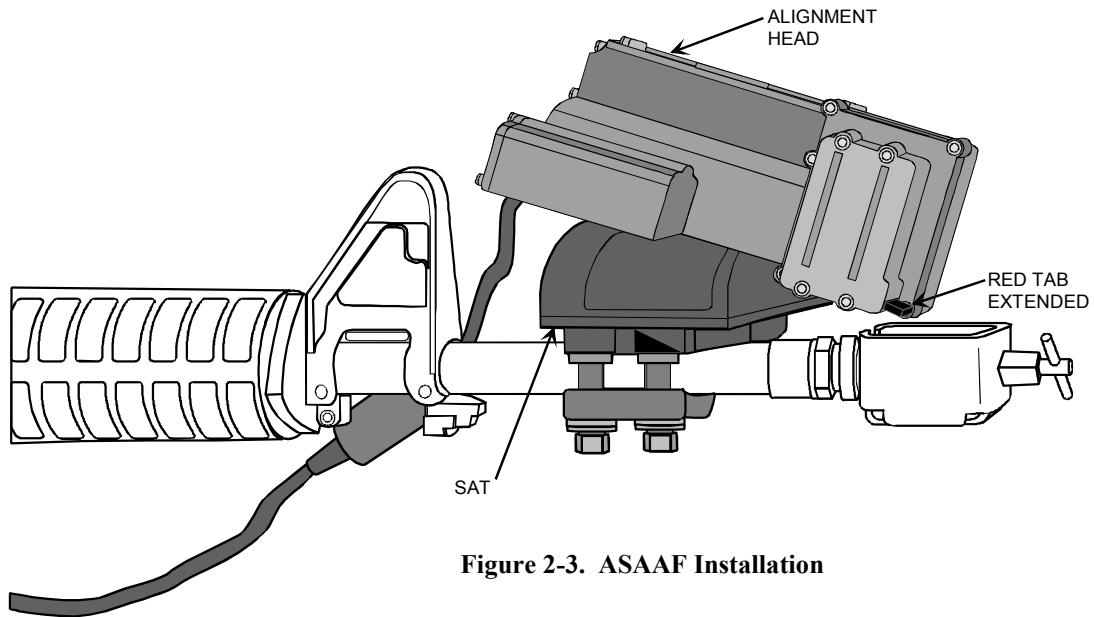


Figure 2-3. ASAAF Installation

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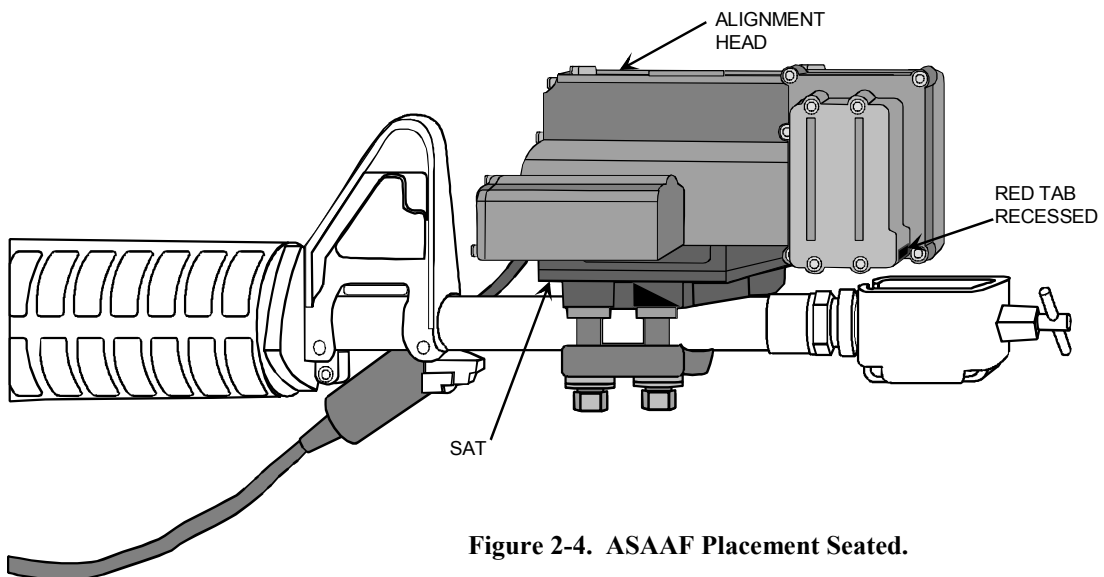


Figure 2-4. ASAAF Placement Seated.

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NOTE

If the SAT on the weapon is not operating properly, the Display Assembly screen of the ASAAF will indicate:

SAT fails (reason for failure)

Replace SAT Weapon - (weapon type)

- (5) To make adjustments to the Display Assembly display screen, press the USER key. Four (4) choices will appear on the screen:

Adjust Contrast

Back Light OFF

Reticle Brightness

Built-In-Test

To make a selection, use Arrow push buttons to scroll to your selection and press the "USER" push button to select. For variable adjustments, use Arrow push buttons until proper contrast or brightness is attained, then press the "USER" push button to set.

- (6) Cock and release the weapon bolt simulating a blank round firing.
- (7) Remove the Alignment Head from the SAT by pulling back and up to release the head.
- b. Upon completion of the alignment procedures and removal of the Alignment Head, install the wedge- lock over the SAT's alignment shafts to prevent movement or damage to the shafts.

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

2.5 ASSEMBLY AND PREPARATION FOR USE UNDER UNUSUAL CONDITIONS.

2.5.1 Unusual Environment/Weather. MILES 2000 equipment is ruggedized to withstand extreme changes in temperature, terrain and environment. Therefore, assembly and preparation in unusual environment/weather should only require the caution necessary to ensure the safety of the operators and other participants.

2. 5.2 Fording and Swimming MILES 2000 equipment is waterproof and ruggedized. Therefore, equipment transport which requires fording and/or swimming should only require caution necessary to safeguard operators and participants, and to maintain control and accountability of the equipment.

2.5.3 Emergency Procedures. MILES 2000 equipment requires no additional procedures for emergency situations, as the equipment has been developed to be used for training simulations encompassing a great variety of conditions and levels of threat.

SECTION V. FUNCTIONAL CHECKS

2.6 FUNCTIONAL TEST PROCEDURES

The functional check for MILES 2000 equipment is accomplished by the Built-In-Test (BIT) performed by the Automatic Small Arms Alignment Fixture (ASAAF). It will run the BIT, and the Display Assembly display screen will stay lighted during the test. Once the test has been run, the Display Assembly will display the results on the screen. Table 3-1 in Chapter 3, Section I, Troubleshooting, contains the list of possible error messages the Display Assembly may display with MILES 2000 equipment.

2.6.1 Built-In-Test (BIT). Upon power-on, the ASAAF will perform BIT (Table 2-3). During operation, pressing and holding the Display button until there are two lighted dots on the display will cause a BIT to be run. If there are no problems, the display will indicate "PASS" upon completion of the BIT. Insufficient power will be indicated with the code "0x2FF."

Table 2-3. Built-In-Test

ACTION	INDICATION
Place batteries in ASAAF Display Assembly.	Display should light and stay lighted throughout the test.
"SWITCH TEST" will be displayed.	ASAAF will automatically begin the BIT. User may now test the ASAAF to ensure the push buttons are working properly. The display should match the label of the push button being pressed.
After Switch Test, BIT will continue.	
BIT results.	"PASS" indicates ASAAF is ready for operation. "FAIL" indicates a problem. Refer to Chapter 3, Section I, Table 3-1.

CHAPTER 3 OPERATOR MAINTENANCE INSTRUCTIONS

SECTION I. TROUBLESHOOTING

3.1 TROUBLESHOOTING PROCEDURES

Following are troubleshooting procedures for problems which may be encountered with MILES 2000 Automatic Small Arms Alignment Fixtures (ASAAF) operation. Operator troubleshooting procedures involve identifying a problem and isolating the problem to the most likely part of the equipment. Generally the BIT run by the ASAAF identifies most problems and produces an error message to let the user know that there is a problem. Operator troubleshooting is neither extensive nor difficult. In most cases, the recommended action will be to turn in the defective ASAAF for repair and replace it with a working unit. Table 3-1 lists problems that may be encountered, as well as possible solutions.

You may encounter equipment problems not addressed in this section. If this is the case, notify the appropriate personnel (a supervisor and/or higher echelon maintenance person) as soon as possible.

Table 3-1. MILES 2000 Troubleshooting Chart for ASAAF.

INDICATION	POSSIBLE/PROBABLE CAUSE	ACTION
“0x2FF” on display after BIT. “0x2FF” displayed after retest. SAT will not align. Any other BIT failure.	Batteries low ASAAF malfunction ASAAF SAT Various	Replace batteries; retest. Replace ASAAF. Reseat Alignment Head and realign. Replace ASAAF if alignment fails. Replace SAT and align new SAT. Check condition of ASAAF Interface Cable. Retest; if failure still occurs, replace ASAAF.

SECTION II. OPERATOR MAINTENANCE

3.2 OPERATOR MAINTENANCE PROCEDURES

Much of the operator maintenance for the MILES 2000 equipment consists of removing the defective item and replacing it with functioning equipment. Remove/Replacement procedures for the Automatic Small Arms Alignment Fixture (ASAAF) are listed below.

3.2.1 ASAAF Removal

- a. Remove the 6-volt NEDA lantern battery from the Display Assembly by opening the hinged cover on the back of it.
- b. After removing the battery, close and latch the cover.
- c. Clean equipment and prepare for turn in.

3.2.2 ASAAF Replacement

- a. Install a 6-volt NEDA-type 529 (lantern) battery in the Display Assembly with the positive (terminal) end first.
- b. Perform BIT.

3.3 DISASSEMBLY PROCEDURES FOR THE ASAAF

- a. Remove the battery from the Display Assembly.
- b. Clean and inspect equipment. If there is any damage to the equipment, report damage on the appropriate form (a separate form for each piece of equipment), and turn in with damaged equipment.
- c. Place equipment in the transit case.

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TO: (<i>Forward to proponent of publication or form</i>) (<i>Include ZIP Code</i>)						FROM: (<i>Activity and location</i>) (<i>Include ZIP Code</i>)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Exact wording of recommended change must be given)</i>	
<i>* Reference to line numbers within the paragraph or subparagraph.</i>							
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